The Utilisation of Computers to Improve the Quality of Learning for Students with Visual Impairment at the University of Zambia

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Abstract

This is a concept paper discussing the use of computers to improve the quality of learning for students with visual impairment at the University of Zambia. The paper argues that enough research has been done on factors affecting learning of students with visual impairment in higher education institutions but it appears little is being done to address the challenges they face especially in the use of computers. Further, while the paper postulates several challenges that may hinder the implementation of research results, it explains the benefits that may accrue to students with visual impairments once they are empowered with computer skills. The paper recommends effective utilisation of research results to improve the quality of learning for students with visual impairment through computers and other ICTs.

Keywords: Blind, Computer, Information Communication Technology, University of Zambia, Visual Impairment.

1. INTRODUCTION

Visual impairment is a general term used to explain the myriad of vision disorders that impair one's ability to see objects from a given distance or a complete inability to see objects from any distance. Within visual impairment are persons with complete loss of the sense of vision, also commonly known as blind, those with partial or low vision caused by other conditions or impairments in the eye structure such as strabismus, astigmatism, myopia or near sightedness and hyperopia or long-sightedness (United Nations Educational, Scientific and Cultural Organisation - UNESCO, 2009; Muma, Nyaywa, Mwelwa, Buglass, & Mbon, 2020). Visual potency contributes a great deal to learning about the environment. Persons with visual impairment depend more on hearing and the use of other senses such as touch, smell and taste to learn. Available literature says 83% of our learning results from sight, 11% from hearing, 3.5% from smell, 1.5% and 1% from taste (Akpnar, Özdas, Yildrim, & Batdi, 2013; Shabiralyani, Hasan, Hamad, & Iqbal, 2015). The loss of sight can be very frustrating to a person who initially had vision but later loses it due to disease, injury or accident. Loss of vision can restrict access to the curriculum unless reasonable accommodations and adaptations

are done to it. In this paper, the term 'visual impairment' is used to refer to students who are blind or unable see anything at any distance.

2. RESEARCH ON THE USE OF COMPUTERS FOR LEARNING PURPOSES BY STUDENTS WITH VISUAL IMPAIREMENT

Students with visual impairment at the University of Zambia face many challenges which include the lack of skills to use computers to write assignments (Muzata, Simalalo, Kasonde_Ng'andu, Mahlo, Banja & Mtonga 2019). The dependence on braille to write assignments and examinations resulted in loss of scripts since course lecturers could not read braille (Muzata et al, 2019). The lack of assistive devices for learning exacerbates the challenges (Simui, Muzata, Sakakombe, & Mtonga, 2020). Generally, in Zambia, the utilisation of ICTs in education has been relatively low (Shafika, 2007), although, Chisunka-Mwila, Daka, Mulauzi and Njobvu (2011) reported that ICTs were slowly taking ground and being used by learners and teachers in schools. The cost of brand new computers is believed to be too high for users, compelling them to depend on second hand and refurbished computers (Raja, 2016, United Nations Educational, Scientific and Cultural Organization, 2014). Muzata (2018) reported that students lacked compensatory skills related to the use of computers for education purposes. Similarly, Mtonga (2013) argued that even when some schools in Zambia had computers, they were obsolete and users did not have the skills to use them. Research shows that students are not prepared to use ICTs for education purposes (Banja & Muzata, 2019).

Studies on the barriers to education for students with visual impairments in higher education in Zambia, show that lack of ICTs is the most restrictive barrier (Simui, 2018; Simui, Sakakombe, Muzata & Mtonga, 2020; Simui, Kasonde-Ngandu, & Nyaruwata, 2017). For instance, Simui, Kasonde-Ngandu, Cheyeka, Simwinga & Ndhlovu, (2018) recommended the use of modern technology to make access to higher education possible for students with visual impairments. Another recommendation made by Simui et al, (2017) was the need to empower teaching staff with ICT skills so that they could use such skills to teach students with visual impairment. In another study, Simui, Kasonde-Ngandu, Cheyeka, & Makoe (2019) noted from lived experiences of students with visual impairment at a university in Zambia thirteen disablers, which impeded their learning. Key among them were the lack of assistive devices for students with visual impairment, exclusive assessment and pedagogy used by lecturers that were seemingly unprepared in terms of expert knowledge and skills to teach students with

visual impairment. One key recommendation from the study was that the University of Zambia should provide access to suitable technology. Muzata (2018) also recommended the introduction of a compulsory ICT course for students with visual impairment.

Globally, successes and challenges in the use computers for education purposes have been reported. Challenges include difficulties in the use of Job Access to Windows (JAWs) software (Ampratwum, Offei, & Ntoaduro, 2016), insufficient special ICTs to cater for the needs of visually-impaired students, inadequate training on the use of special ICTs, and a shortage of ICT experts (Eligi & Mwantimwa, 2017). In Turkey, learners with visual impairment were able use messenger application, links and changing browsers. They were also able to adjust font size and change font colour but had difficult underlining words, saving a document to a disc, selecting specified words, navigating menus, formatting font style and copying text from a web page (Ùimúeka, Altuna, & Ateúa, 2010).

Unless training is provided, students with visual impairment would face problems accessing internet services such as education websites, online registration facilities, education platforms such as Moodle, Astria and other social learning virtual platforms such as Whatsapp, Google meet, Zoom to mention a few. There is no doubt that, online learning interventions employed by the University of Zambia during the covid-19 closure of physical learning may have posed serious learning challenges for students with visual impairments.

For students with visual impairment, a resource room equipped with various ICT resources such as Braille keyboards, speakers/earphones, screen readers installed on computers, microphones, digital voice recorders, Braille display, Braille embosser among others would provide them with various options for learning (Ayebi-Arthur, Aidoo, Ntim, & Tenkorang, 2009; Muzata, 2013).

3. HINDRANCES TO THE IMPLEMENTATION OF STUDIES' RECOMMENDATIONS

There are many possible factors affecting the implementation of research recommendations on the education of students with visual impairment. These include:

3.1 Negative attitudes

It is possible to say the University is demonstrating negative attitudes towards improving the quality of learning through computers for students with visual impairment because students seem to report the same difficulties in recent studies (Muzata, et al, 2019; Simui, 2018; Muzata,

2018). Despite the University demonstrating a positive gesture to implement the policy on inclusive education by admitting students with visual impairment among others, mainly in the Department of Educational Psychology, Sociology and Special Education, there is more that needs to be done to realise a sense of reality of inclusive education. The failure to invest in specialised ICTs and computers for students to facilitate effective learning and independence to access the university curriculum may render their admission rhetoric. Students with visual impairment so far make the majority among persons with disability admitted in the Department of Educational Psychology, Sociology and Special Education (Muzata et al, 2019). ICTs and specifically computers can make students to learn independently (Thompson, 2018).

3.2 Lack or underutilisation of Research Results

It may be postulated that the problem may lie in a lack of reading research publications available informing the university on the need to improve the quality of learning through ICTs for students with visual impairment. For instance, the School of Education, where most students with disabilities are admitted has two offices managing research (Assistant Dean - Postgraduate and Assistant Dean-Research) under the Dean of the School of Education. It is expected that the Assistant Dean–Research office not only documents the researches undertaken in any particular year or quarterly but also facilitates dissemination and communication of research results to the university administration and the general Zambian populace. After dissemination, follow-ups are supposed to be made to see whether the recommendations out of research are being implemented or not and provide reasons for lack of implementation.

3.3 Lack of resources

It is undoubted that Universities suffer from financial challenge. This challenge has continued to haunt education for all students and worse for students with disabilities whose specialised learning equipment is considered to be more expensive (Raja 2016; United Nations Educational, Scientific and Cultural Organization, 2014) than that for learners without disabilities. However, efforts should be seen to be made towards purchasing ICT equipment for students with disabilities even in intervals.

3.4 Lack of specialised personnel

This may prove to be a challenge because the university establishment may be restrictive on employing specialists to specifically handle the teaching of computers and other ICTs to students who are differently abled. This requires a review and possible measures to train existing staff in ICTs for the differently abled.

3.5 System challenges

Like already mentioned in 3.2 above, the likelihood that research information reaches the highest decision making organ of the university is low due to bureaucracy in handling research output. This needs easing.

3.6 The lack of a disability unit and policy

Although a disability unit may have a connotation of exclusion within inclusion, its existence would help to be a liaison between students with disabilities, the university and other interested parties in the country. A disability unit would have a research data bank that would be used to champion the quality of learning for students with disability in the university. Without this unit, a gap will continue to exist in the utilisation of research results. Simui, (2018) and Muzata et al (2019) noted the relevance of a disability unit and policy in the university to champion the needs of students with disabilities.

3.7 Linkage to a National Research Institute

The question that further needs answers is whether the university is linked to any National Research Institute that collects data on various researches and particularly in the area of disability and specifically visual impairment. This linkage would be necessary to monitor the quality of education research for all students including those with visual impairment.

3.8 Ethical considerations

The application of ethics in research appears to limit the utilisation of research results. In the study by Simui (2018) for instance, the university where students with visual impairment faced difficulties in learning was not named for ethical reasons. This is one limitation that ethics imposes on the utilisation of research data. However, it is not a good reason to fail to use the necessary results provided in the studies given that the University which was a focus of studies on students with visual impairment maybe publicly known to admit students with visual impairment.

4. BENEFITS OF COMPUTERS TO STUDENTS WITH VISUAL IMPAIREMENT

Learning in higher education institutions today is now dependent on the use of ICTs and the computer is basically the top ICT tool used. Students are required to type assignments and submit them electronically. The need to provide computer skills to especially students with visual impairment should not be ignored. At the University of Zambia, the situation was more amplified during the covid-19 disease out-break that saw universities and other learning institutions closed in March 2020 and the subsequent introduction of online lessons through

Moodle. Although, the experiences of students with visual impairment have not yet been documented through research, it may be inferred that they had challenges learning via e-learning mechanisms that were introduced. Figure 1 provides an illustration of how students with visual impairment can use the computer to improve learning.

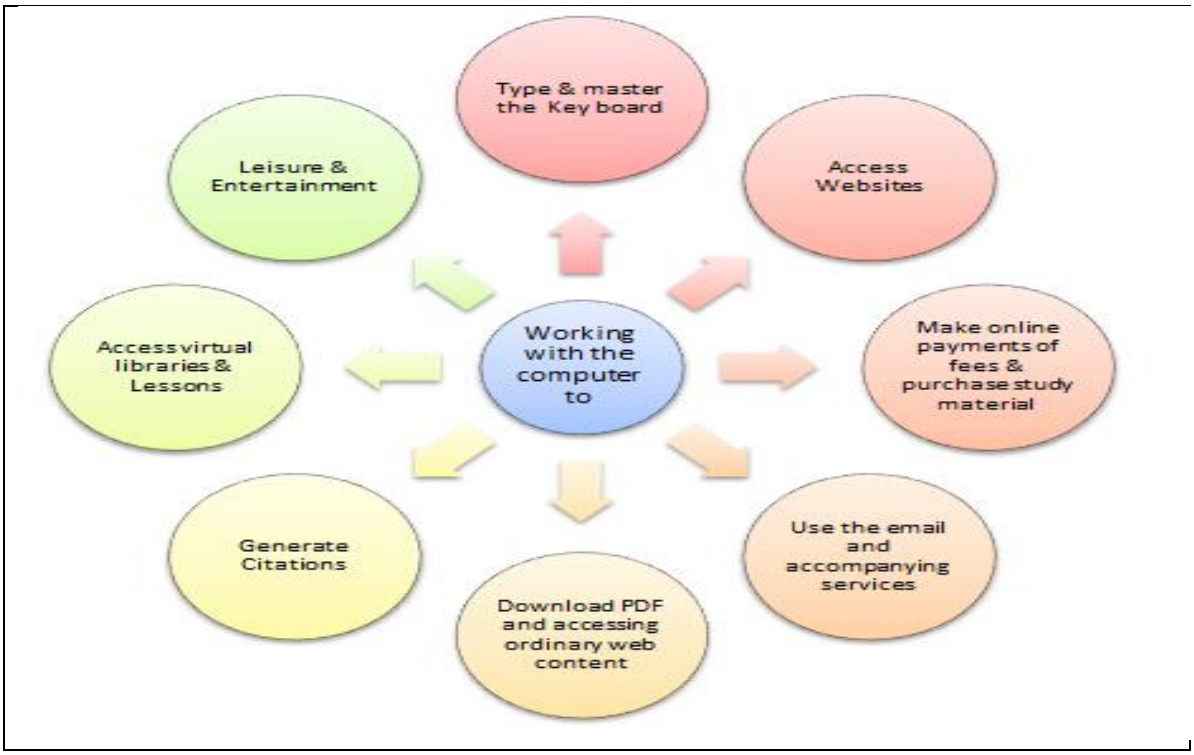

Figure 1: Computer functions that students need to know; **Source**: Author

4.1 Typing function

Although braille embossed keyboard is better than having a computer installed with JAWS, it may be difficult to find the latest computer embossed keyboards to enable typing. A computer installed with JAWS would allow a student with a disability to master the key board and perform typing and editing functions (Kapperman & Sticken, 2003). The student can type assignments and spellcheck responses to ensure that the text submitted is well written. Students need to learn typing skills. For instance, the selection of font size, letter type, spacing, bolding and un-bolding, doing and un-doing typing, spacing and selecting text among other functions need to be taught to the students. Thus, ICTs can enhance reading and writing skills, as well as communication with the world on an equal basis, thereby improving quality of life and facilitating the learning process (Alves, Monteiro, Rabello, Gasparetto & Carvalho, 2009).

4.2 Access to websites

Students with visual impairment need to learn how to access the different websites using links and search engines. Student need to learn how to use the cursor to copy a link and use it to find information on any website or to type search words in search boxes when the computer is connected to internet.

4.3 Payments and purchase of online material

Today, many financial transactions are conducted online. This reduces the risk of handling cash. Persons with visual impairment have challenges in making online transactions (Fuglerud, 2011). For students with visual impairments, knowledge of this skill would help them to independently perform financial transactions to make payment of their university fees and to buy electronic books from online shops.

4.4 Use of email and accompanying services

The email can aid students to send their assignments and communicate with lecturers and peers on academic matters. Competent use of the email can help students enhance their learning. While in the email, other live services such as hangouts, chats can help students make consultations with their lecturers and peers on academic matters. In google email for instance, one can start or join a google meeting, schedule a calendar of personal and academic events or use Zoom App to join and start meetings with peers and or lecturers for academic purposes. These and other email related services, SMS and ATM are technology advances that are helpful to persons with visual impairment to become independent in their learning (Fuglerud, 2011). Beyond leisure and entertainment, social networks and web 2.0 technologies has been found to play an important role in facilitating the sharing of knowledge and competence among people (Fuglerud, 2011**).**

4.5 Downloading educational material

Students with visual impairment can have full access to educational materials available on the internet. There are free books online, lectures on certain topics in either audio or video and some power-point lessons available for free downloads by all internet users. Other books cannot be downloaded but can be used while online as in google books. Audio books are available for downloads and with knowledge and skills to explore the web, students with visual impairment should not find learning challenging. Several files in either word or PDF formats can be accessed as research articles, books or presentations. The computer provides a wider screen to navigate several functions leading to different sites.

4.6 Generation of citations

If students find it difficult to write references owing to various demands by different citation styles (Muzata & Banja, 2019), the computer has an inbuilt system for generating a reference list of the citations used. This skill is needed by students with visual impairment more than any other. There are other inbuilt functions on the computer that can be used to generate needed information. For instance, the table of contents, figures and tables can be generated by auto means that come after certain entries pertaining to what one needs are made.

4.7 Access to virtual libraries and lessons

Virtual libraries are an order of modern learning now. Knowledge of how to access virtual libraries provides access to broader learning opportunities. Students can create accounts and log into a foreign university library at the comfort of their computer connected to the internet. Virtual lessons are also possible.

4.8 Leisure and entertainment

All learning requires space to relax and the computer offers various opportunities to relax. Games installed on the computer and online games can provide space for leisure. Music in form of audios and videos is available to provide opportunities for leisure and entertainment. Students with disabilities need to be taught how to access these services, how they can download and save them on their computers or on external drives.

5. CONCLUSION AND RECOMMENDATIONS

ICTs can increase independence among students with disabilities. Training students with visual impairment in computers would not only help them learn effectively but also provide lifelong skills for the world of formal and informal employment. In view of the discussion, the following recommendations should be considered by the University management to provide realistic inclusive education for students with visual impairment:

i. The University of Zambia Management should utilise research results to improve the quality of learning for students with visual impairment through computers and other ICTs.
ii. There is need to enhance the operations of the Special Education Needs Resource Centre by equipping it with necessary specialised resources and an ICT competent person or lecturer to help students with visual impairment to learn computers and access learning materials.
iii. The course, ‘Computer Applications in Special Education’ should be reintroduced to first year students pursuing Bachelor of Education in Special Education. The University

of Zambia scrapped off the course which helped to equip students training to be teachers in the application of computers in teaching learners with disabilities.

iv. The University library should have computers installed with JAWS software or with braille embossed keyboards for easy access by students with visual impairment using the library.

v. The University library can further consider having an ICT specialised person to train students with visual impairment in the use of the electronic library services.

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